Supplementary Material for River Engage: Insights on plastic debris polluting the Aturukuku River in Uganda, the Ayung River in Indonesia, and the Connecticut River in the United States

Table 1. Compilation and categorization of responses to question: *Please list the top five most frequently found items in the Aturukuku river* with example responses taken from the surveys.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site andsample size | Plastic | Metal | Glass | Processed Trees | Cloth, Clothes, Fabric,  | Medical | Animal waste | Plant waste | Indeterminate |
| Aturukuku River(*n*=61)Pretest | 21 (34%)plastic bags, polyethylene paper, pampers | 5 (8%)metal cans, metal | 1 (2%)broken glasses | 5 (8%) paper, logs | 12 (20%) cloth, clothes, rags | 1 (2%) gloves and used hospital items  | 3 (5%) dead animals (dead dog), animal remains and wastes like bones | 4 (7%) water hyacinth, banana peels | 9 (15%)debris, gloves, food packaging containers |
| Aturukuku River(*n*=55)Immediate post-test | 26 (47%)food wrappers, polyethylene bags, ropes (nilon) |  |  | 4 (7%) wood, packing paper | 9 (16%) cloth, clothes | 1 (2%) syringes |  | 2 (4%) Natural materials like poles and plant remains | 13 (24%) cups, shoes, containers |
| Aturukuku River(*n*=45)Two monthpost-test | 23 (51%) food wrappers, used polyethylene bags, plastic bottles |  | 1 (2%) broken glasses | 3 (7%) logs, stick | 7 (16%) cloth, clothes | 4 (9%) syringe, paper from used syringe |  |  | 7 (16%) toys, worn out shoes, straw |

Table 2. Compilation and categorization of responses to question: *Please list the top five most frequently found items in the Ayung river* with example responses taken from the surveys.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site andsample size | Plastic | Metal | Glass | Rubber  | Cloth, Clothes, Fabric | Other natural materials | Other | Hazardous materials | Indeterminate |
| Ayung River(*n*=65)Pretest | 45 (69%) food wrappers, plastic bag, detergent wrap | 7 (11%) tin | 1 (2%)glass | 1 (2%) rubber  | 6 (9%) fabric | 2 (3%) rope | 1 (2%) tetrapak |  | 1 (2%) aluminum-plastic |
| Ayung River(*n*=68)Immediate post-test | 38 (56%) plastic fragment, SUP, plastic straw | 2 (3%) tin |  |  | 14 (21%) fabric, clothes | 4 (5%) jute bags, organic waste |  | 1 (1%) hazardous waste | 9 (13%) personal care products, unidentified |
| Ayung River(*n*=66)Two monthpost-test | 34 (52%) plastic bags, food wrappers, menstrual pads | 1 (2%) aluminum | 2 (3%) glass bottle, glass | 2 (3%) rubber  | 12 (18%) fabric | 8 (12%) organic waste, jute bags | 1 (2%) religious related waste |  | 6 (9%) personal care, wallet, bags |

Table 3. Compilation and categorization of responses to question: *Please list the top five most frequently found items in the Connecticut river* with example responses taken from the surveys.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site andsample size | Plastic | Metal | Glass | Rubber | Processed Trees | Cloth, Clothes, Fabric | Medical | Indeterminate |
| Connecticut River(*n*=40)Pretest | 21 (53%)plastic bag, cigarette butt, plastic bottle | 6 (15%)metal can, aluminum can, metal appliance | 0 | 1 (3%)tire | 1 (3%)paper | 1 (3%)cloth | 1 (3%)needle | 9 (23%)bottles, cans, bags, fishing gear |
| Connecticut River(*n*=40)Immediate post-test | 22 (55%) cigarettes, nip bottles, nurdels, hard plastic fragments | 6 (15%) aluminum cans, metal caps  | 6 (15%) glass bottles, glass fragments, glass | 0 | 3 (8%) paper  | 1 (3%) cloth | 0 | 2 (5%) bottles, cans |
| Connecticut River(*n*=20)Two monthpost-test | 14 (70%) hard plastic scrap, plastic utensils, nip bottles | 2 (10%) metal can(s) | 1 (5%) glass bottle | 1 (5%) tires | 1 (5%) paper |  |  | 1 (5%) bottle caps |

Table 4: Compilation of responses to the question: *Please list the top three policies that are helpful for combating the river litter problem in your community* for theUgandan sample. Responses are subdivided and categorized according to whether the policy addresses the symptoms or the sources of debris. An example response taken from the surveys is shared for each.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Symptom-based  | total | Source-based  | total | n/a |
|  | Recycling: Policies that encourage or increase recycling | Fines: Policies levying fines | Clean ups | Education | Better Waste Management including collection, separation, landfills, incineration | Behavior | Research |  | Policy | Reduce: Policies that encourage reducing use of a material | Bans: Policies that ban certain plastics | Alternatives: Promoting alternatives to plastic |  | Indeterminate responseOr does not know |
| Aturukuku River(*n*=30) pretest | 4 (13%) To collect bottles and recycle | 3 (10%)People who dump their litters any howly should be fined | 1 (3%)Regular cleanups of community or social centers. | 2 (7%)Sensitising community members | 6 (20%)Dump waste materials in one pit to avoid litering | 3 (10%)To stop throwing bottles any howly. |  | 19 (63%) | 4 (13%)Formation of community bye laws on litter. | 2 (7%)Use of polyethene bags and plastic bottle should be limited | 3 (10%)Banning the production of polythene bags. | 1 (3%)Encouraging the use of leather bags to prevent use of polythene papers | 10 (33%) | 1 (3%)To circle the plastic |
| Aturukuku River(*n*=21) Immediate post-test | 2 (10%)By collecting the bottles and recycle | 2 (10%)anyone found littering Garbage should be fined. |  | 2 (10%)By creating thouroughly grassroot awareness about the use of plastics in the environment. | 5 (24%)A community should have one dumping center. | 3 (14%)By not throwing the papers anyhowly |  | 14 (68%) | 3 (14%)Byelaws to be put in place |  | 3 (14%)Banning production of plastics in industries |  | 6(28%) | 1 (5%)Burning off plastic factories |
| Aturukuku River(n=20) Two month post test |  | 4 (20%)By ticketing those people who throw litters everywhere | 1 (5%)By involving individuals to collect litters on the street | 2 (10%)People should be educated on dangers of river litter problem | 4 (20%)Garbage collection of the district | 1 (5%)Stopping throwing away plastic bottles, as now done at Potela zone | 1 (5%)Paying people to collect data | 13 (65%) | 1 (5%)Bye-laws formed by the local community |  | 2 (10%)By banning the use of single use materials in the country | 1 (5%)by using biodegradable material | 4(20%) | 3 (15%)Throwing bottles is dangerous |

Table 5: Compilation of responses to the question: *Please list the top three policies that are helpful for combating the river litter problem in your community* for the Indonesian sample. Responses are subdivided and categorized according to whether the policy addresses the symptoms or the sources of debris. An example response taken from the surveys is shared for each.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Symptom based |  | Source based  |  |  |
|  | Recycling: Policies that encourage or increase recycling | Better Waste Management including collection, separation, landfills, incineration | behavior | education | Cleanup | Punishment | total | Refuse | Re-using: Policies that encourage re-using | Businesses stop selling SUPs | Reduce: Policies that encourage reducing use of a material | Bans: Policies that ban certain plastics | Alternatives: Promoting alternatives to plastic | total | Indeterminate responseOr does not know |
| Ayung River(n=31) pretest | 2 (6%)Recycle.  | 5 (16%)Waste management in village level |  |  |  |  | 7 (22%) |  | 4 (13%) Cafe suggests to bring owned tumblr | 5 (16%)Convenience store stop using SUP | 3 (10%)Reducing plastic usage on college's activities | 6 (19%)Bans on single use plastic | 5 (16%)Socialization of using bamboo straw | 23 (74%) | 1 (3%)Reward & punishment for people |
| Ayung River(n=32) Intermediate post-test | 2 (6%)Recycle and providing facilities | 9 (28%)Providing waste sorting facility | 1 (3%)Stop littering |  |  |  | 12(37%) | 1 (3%)Not using plastic straw | 5 (16%)Obligatory usage of tumblr in events | 6 (19%) Starbucks stop using plastic straw | 2 (6%)reduce | 3 (9%)Bans on SUP | 2 (6%)Use biodegradable plastic | 19(59%) | 1 (3%)Reward & punishment for people |
| AyungRiver(n=39) Two month post test | 1 (3%)Recycle.  | 6 (15%)Incentive for villages that manage their own waste | 3 (8%)Bring back our trash when hiking | 7 (18%)Public awareness for respecting environment | 3 (8%)Beach clean up | 2 (5%)Penalty for people who litter | 22 (57%) | 3 (8%)Don't use straw and plastic spoon | 3 (8%)Reuse | 2 (5%)Supermarkets stop using SUP | 4 (10%)Less plastic | 3 (8%)Governor bans on SUP | 2 (5%)Use alternative packaging | 17 (44%) |  |

Table 6: Compilation of responses to the question: *Please list the top three policies that are helpful for combating the river litter problem in your community* for the American sample. Responses are subdivided and categorized according to whether the policy addresses the symptoms or the sources of debris. An example response taken from the surveys is shared for each.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Symptom based | total | Source-based | total | n/a |
|  | Recycling: Policies that encourage or increase recycling | Fines: Policies levying fines for littering | Clean ups | Education |  | Re-using: Policies that encourage re-using | Bans: Policies that ban certain plastics | EPR: Extended producer responsibility | Reduce: Policies that encourage reducing use of a material | Alternatives: Promoting alternatives to plastic |  | Indeterminate responseOr does not know |
| Connecticut River(*n*=14)Pretest | 5 (36%)recycling in general |  | 1 (7%)bi-annual river cleanup by public works | 1 (7%)programs about river pollution by local non-profits | 50% | 3 (21%)shopping bag reuse |  | 1 (7%) Senate bill 115 EPR packaging |  | 1 (7%)using bamboo cutlery for takeout | 35% | 2 (14%)fishing (commercial) |
| Connecticut River(*n*=16)Immediate post-test | 4 (25%)bottle bill |  |  |  | 25% | 2 (13%)reusable food container policies | 2 (13%)plastic bag ban | 2 (13%)extended producer responsibility | 1 (6%)plastic straw reduction |  | 45% | 5 (31%)unaware of any |
| Connecticut River(*n*=11)Two monthpost-test | 2 (18%)bottle bill expanded to include nip bottles | 2 (18%)littering fines of up to 300 dollars |  |  | 36% | 3 (27%)reusable mugs | 2 (18%)straw ban |  | 1 (9%)some restaurants do not give out straws unless you ask | 1 (9%)some restaurants use cardboard to go containers | 63% |  |